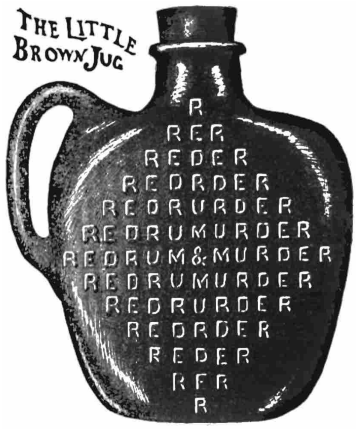
Problem H: The Little Brown Jug

Palindromes —words or sentences which would read the same backward as well as forward— have been a good source of puzzles for centuries. Here's an old puzzle originally created for the benefit of a temperance organisation.

In the figure you can see a curious disposition of the palindrome "Red rum & murder" in the shape of a rhombus. The problem is, in how many ways can you read the palindrome on the jug?

You can start at any 'R' inside the rhombus, and move in any direction (up, down, left, right or any diagonal), forming the correct sequence of letters until you finish at any other 'R', having spelled the complete palindrome.



The palindromic rhombus

The general problem can be described as follows: you are given a palindrome P of length L, where L is an odd number —that is, L is of the form $2k+1$. A *palindromic rhombus* is formed using the sequence of characters P in the following way:

The first row is formed by the first letter of P. For every i in the range $2 \ldots k+1$, the row i is formed by starting one column to the left, relative to the previous row, and using the first i letters of P, followed by the first $i-1$ letters in reverse order. Finally, the rows $k+2 \ldots L$ are the same as the rows $1 \ldots k$ in reverse order.

Your task is to find the number of distinct ways in which you can read the original palindrome P, starting and finishing at any position of the rhombus, as long as you always move in any of the 8 possible directions to find the next letter.

Input

Input starts with a positive integer **T**, that denotes the number of test cases.

Each of the following T lines contains a palindrome of length **L**. The palindrome is formed by uppercase letters from the English alphabet and any of the following 5 symbols: `@#$%&`.

You can also assume that L is odd.

$T \leq 400$; $1 \leq L < 50$

Output

For each test case, print the case number followed by the number of ways in which the given palindrome can be read from its corresponding rhombus. Since this number can be very large, print the answer modulo 1000000007.

Sample Input	Output for Sample Input
4 REDRUM&MURDER WASITACATISAW MADAMIMADAM EVE	Case 1: 138384 Case 2: 63504 Case 3: 40000 Case 4: 16